

What is claimed is:

CLAIMS

1. An motion control system for use with a lithography system, said motion control system comprising:

a wafer stage base;

at least two actuators for controlling motion;

at least two sensors for detecting at least one parameter of displacement of said wafer base and producing at least two signals in response thereto; and

at least one circuit in electrical communication with said actuators and said sensors;

wherein, upon the detection of said at least one parameter of displacement by said sensors, said sensors signal said circuit, which, in response, activates said actuators to stabilize the wafer stage base.

2. The motion control system of claim 1, said actuators are selected from the group consisting of a voice coil motor and electroactive stack actuator.

3. The motion control system of claim 1, said sensors selected from the group consisting of LVDT, accelerometer, laser interferometer, capacitive displacement sensor.

4. The motion control system of claim 1, said circuit comprising a digital signal processor.

5. The motion control system of claim 1, said circuit comprising:

at least one digital signal processor,

at least one analog to digital converter, and

at least one digital to analog converter.

6. The motion control system of claim 1, said circuit comprising a control technique.

7. The control technique of claim 6, said control technique selected from the group of linear quadratic gaussian, H-infinity, and mu-synthesis.

8. The motion control system of claim 1, wherein said actuators stabilize said wafer stage base to closely follow a commanded input.

9. An motion control system for use with a lithography system, said motion control system comprising:

a wafer stage;

at least two actuators for controlling motion;

at least two sensors for detecting at least one parameter of displacement of said wafer base and producing at least two signals in response thereto;

a signal conditioner; and

a single board computer

wherein, upon the detection of said at least one parameter of displacement by said sensors, said sensors feed a signal to said signal conditioner, said signal conditioner feeds a signal to said single board computer, and said single board computer commands said actuators to command said wafer stage to track a commanded position.

10. The motion control system of claim 9, wherein said actuators are selected from the group consisting of voice coil motor and electroactive stack actuator.

11. The motion control system of claim 9, wherein said sensors are selected from the group consisting of LVDT, accelerometer, laser interferometer, capacitive displacement sensor.
12. The motion control system of claim 9, wherein said wafer stage is commanded to track a commanded position within 0.19 seconds.
13. A motion control system of Claim 1, wherein said circuit comprises a processor programmed with a control algorithm derived from a mode based state-space model.
14. A system as in Claim 13, wherein said state-space model is derived using a finite element model with fictitious masses.
15. A system as in Claim 13, wherein said processor is an element of a linear quadratic Gaussian controller.